

CLAIMS

1. A method for fabricating a probe for a scanning probe microscope, comprising the steps of:

5 (a) forming a first mask pattern for defining a probe tip on a wafer including a handle layer on which a mounting block of the probe is formed, an insulating film on the handle layer and a device layer in which a cantilever and a probe tip of the probe are formed;

10 (b) forming a second mask for defining the cantilever of the probe on the device layer and the first mask;

(c) etching the device layer by using the first and the second mask as patterns;

(d) removing the second mask;

15 (e) forming a sidewall passivation layer on a sidewall of the device layer;

(f) etching the device layer by using the first mask as a pattern while leaving a thickness thereof as much as a thickness of the cantilever;

20 (g) removing the first mask;

(h) forming the probe tip by performing a wet etching process on the device layer;

(i) removing the sidewall passivation layer;

(j) forming a third mask for defining the mounting
25 block of the probe on a lower surface of the handle layer;

(k) etching the handle layer by using the third mask

as a pattern; and

(1) removing the third mask.

2. The method of claim 1, wherein the wafer is an SOI
5 (silicon on insulator) wafer including a device layer
containing {111} single-crystalline silicon, an insulating
oxide film and a handling layer containing {100} single-
crystalline silicon.

10 3. The method of claim 1, wherein the first mask uses a
wet thermal oxide film or a TEOS oxide film.

4. The method of claim 1, wherein the second mask is a
TEOS oxide film, a metal film using Cr or Al, or a PR
15 (photoresist) layer.

5. The method of claim 1, wherein in the step (c), the
device layer is etched by employing a dry etching method
using a DRIE (deep reactive ion etching).

20

6. The method of claim 1, wherein in the step (c), an
aspect ratio of the probe tip is determined depending on an
angle formed by the sidewall of the etched device layer and
an upper surface of the insulating layer.

25

7. The method of claim 1, wherein the sidewall

passivation film is formed by growing a wet thermal oxide film or a silicon nitride film on the sidewall of the device layer.

5 8. The method of claim 1, wherein in the step (h), the probe tip is formed by defining a {111} surface by employing a wet etching method using a KOH solution, a TMAH (tetramethyl ammonium hydroxide) solution or the like.

10 9. The method of claim 1, wherein in the step (j), the third mask is formed by using a silicon oxide film or a silicon nitride film.

10. The method of claim 1, wherein in the step (k), the
15 handle layer is etched by using a wet etching method or a dry etching using the DRIE.

11. The method of claim 1, further comprising the step of
oxidation process on a surface of the device layer to
20 sharpen the probe tip after performing the step (i).

12. A probe for a scanning probe microscope fabricated by using any one of the methods of claims 1 to 11.